

Supporting Information

Highly Flexible and Optical Transparent 6F-PI/TiO₂ Optical Hybrid Films with Tunable Refractive Index and Excellent Thermal Stability

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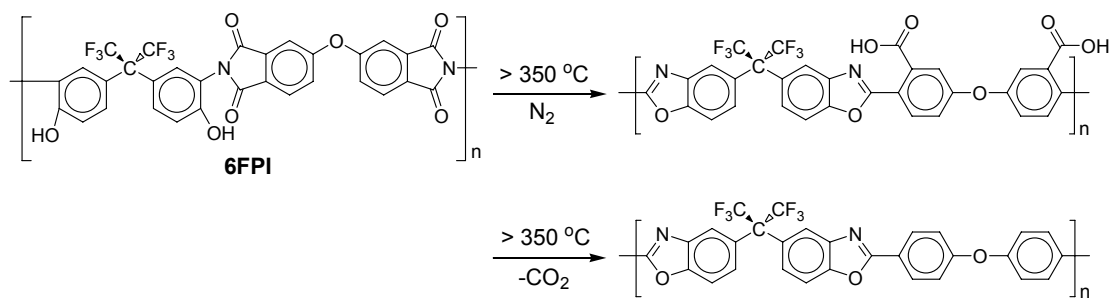
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Scheme S1 Proposed reaction for thermal conversion of hydroxy-imides to benzoxazoles.

Table S1 Inherent Viscosity, Molecular Weights and Solubility Behavior of Polyimide **6FPI**

polymer	η_{inh} (dL/g) ^a	M_w ^b	PDI ^c	Solubility in various Solvent ^d						
				NMP	DMAc	DMF	DMSO	<i>m</i> -cresol	THF	CHCl ₃
6FPI	0.51	34500	1.50	++	++	++	++	+	++	-

^a Measured at a polymer concentration of 0.5 g/dL in DMAc at 30 °C. ^b Calibrated with polystyrene standards, using DMF as the eluent at a constant flow rate of 1 mL/min at 50 °C. ^c Polydispersity. ^d The qualitative solubility was tested with 10 mg of a sample in 1 mL of stirred solvent. (++) soluble at room temperature, (+) soluble on heating, (–) insoluble even on heating.

Table S2 Color Coordinates and Cutoff Wavelength (λ_0) from UV-Vis Spectra of **6FPI** Hybrid Materials.

sample	Color coordinate ^a			Color coordinate ^b			λ_0 (nm)
	Y	x	y	b*	a*	L*	
6FPI ^c	90.1	0.33	0.36	14.53	-5.79	96.03	293
6TP10 ^c	88.3	0.33	0.38	21.45	-14.23	95.37	303
6TP30 ^c	88.3	0.33	0.39	24.87	-18.23	95.29	304
6TP50 ^c	80.6	0.34	0.40	29.41	-17.02	91.95	307
6TP70 ^c	76.3	0.35	0.42	37.42	-19.60	89.99	317
6FPI ^d	88.1	0.35	0.37	21.84	-0.76	95.20	351
6TP10 ^d	88.1	0.36	0.39	31.03	-4.64	95.20	355
6TP30 ^d	87.3	0.36	0.41	37.91	-12.45	94.87	355
6TP50 ^d	80.1	0.37	0.44	49.25	-18.61	91.73	359

^a The CIE Yxy color scale. ^b The CIE L*a*b* color scale. ^c Hybrid thin films (thickness: 150-650 nm). ^d Hybrid thickness films(thickness: 20-30 μ m).

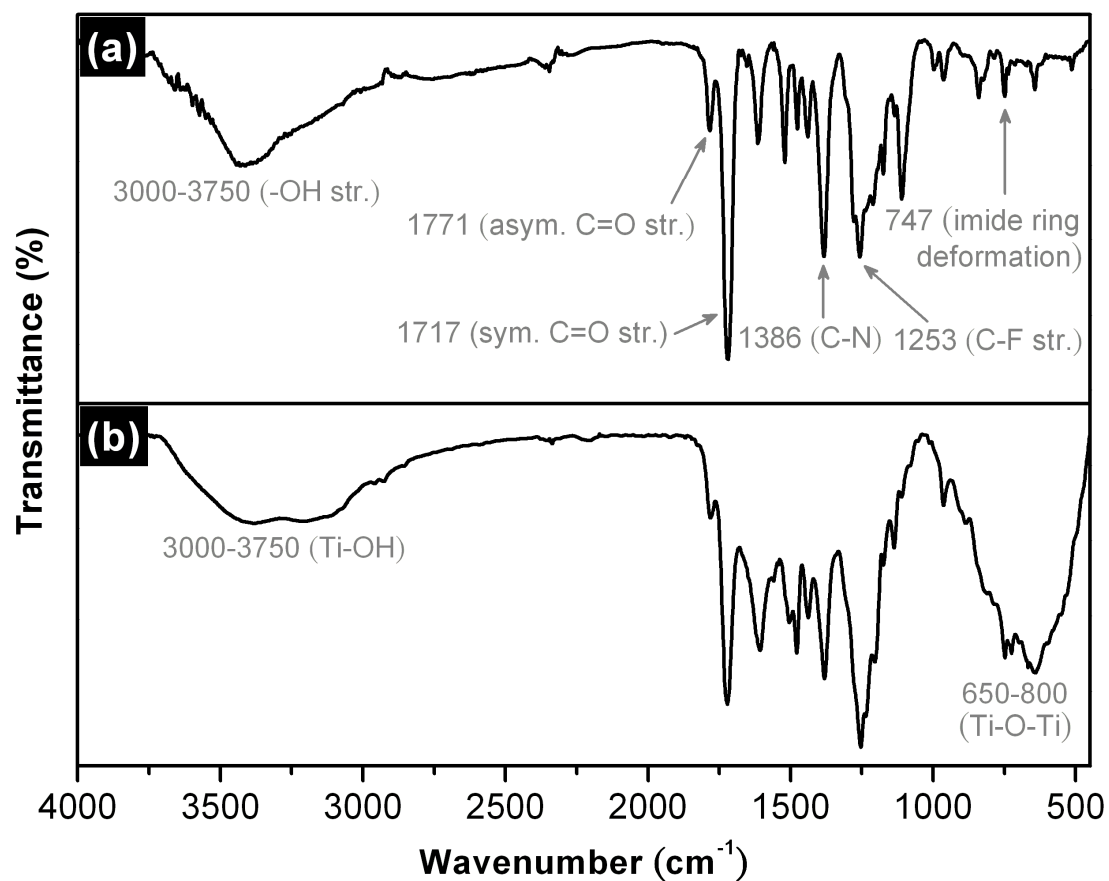


Fig. S1 FTIR spectra of the studied films (a) **6FPI** (b) **6TP50**.

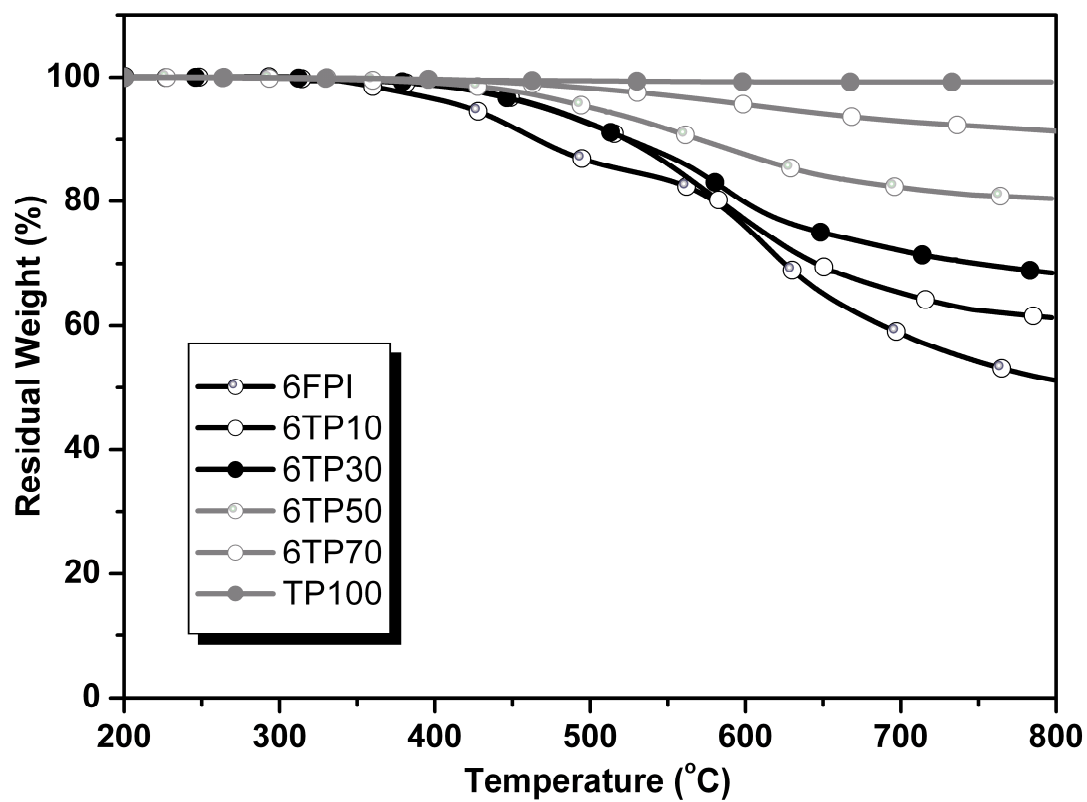


Fig. S2 TGA thermograms of 6FPI hybrid materials in N₂.

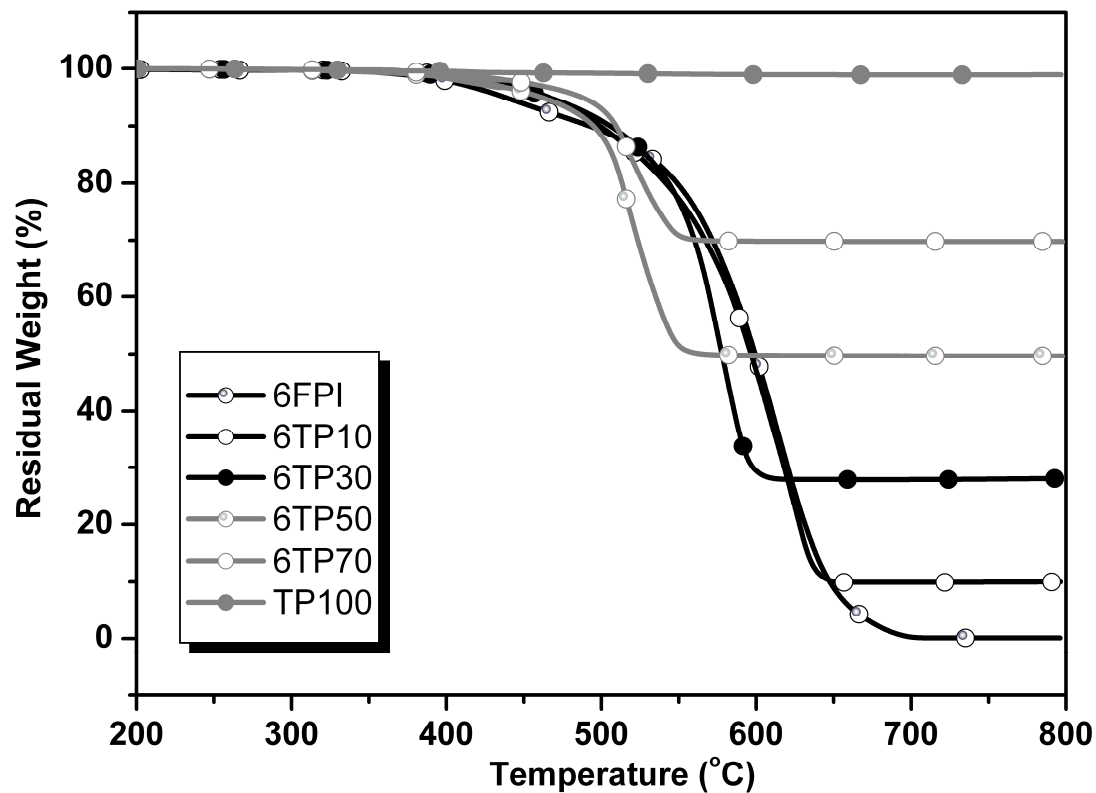


Fig. S3 TGA thermograms of 6FPI hybrid materials in air.

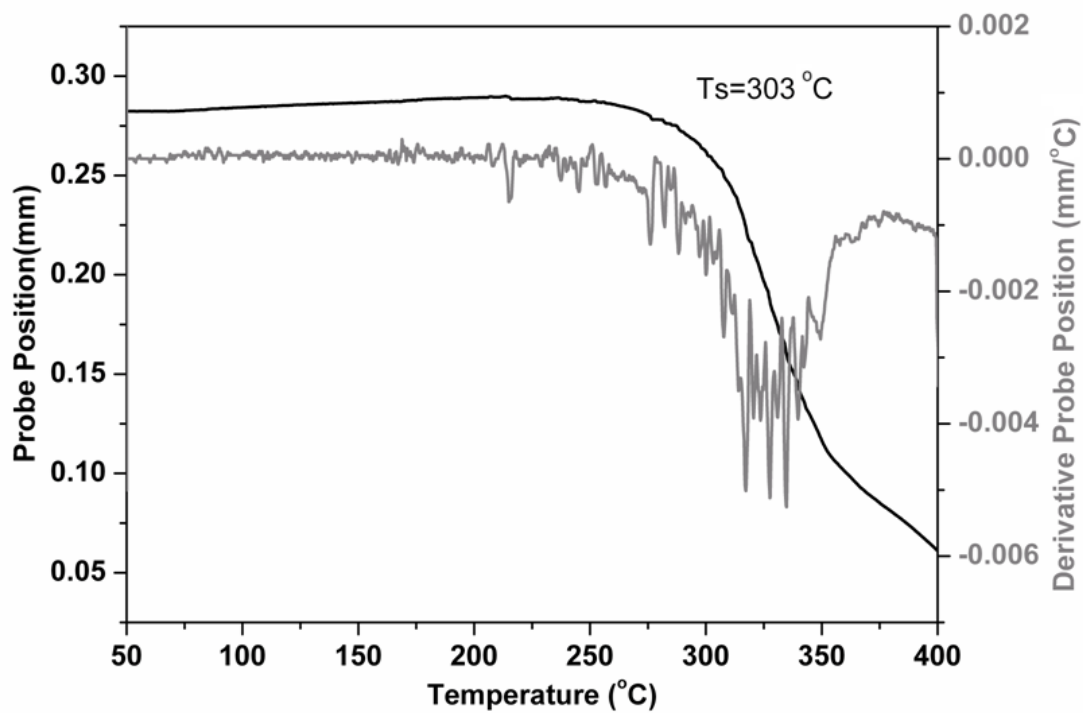


Fig. S4 TMA curve of 6TP30 with a heating rate of 10 °C/min.

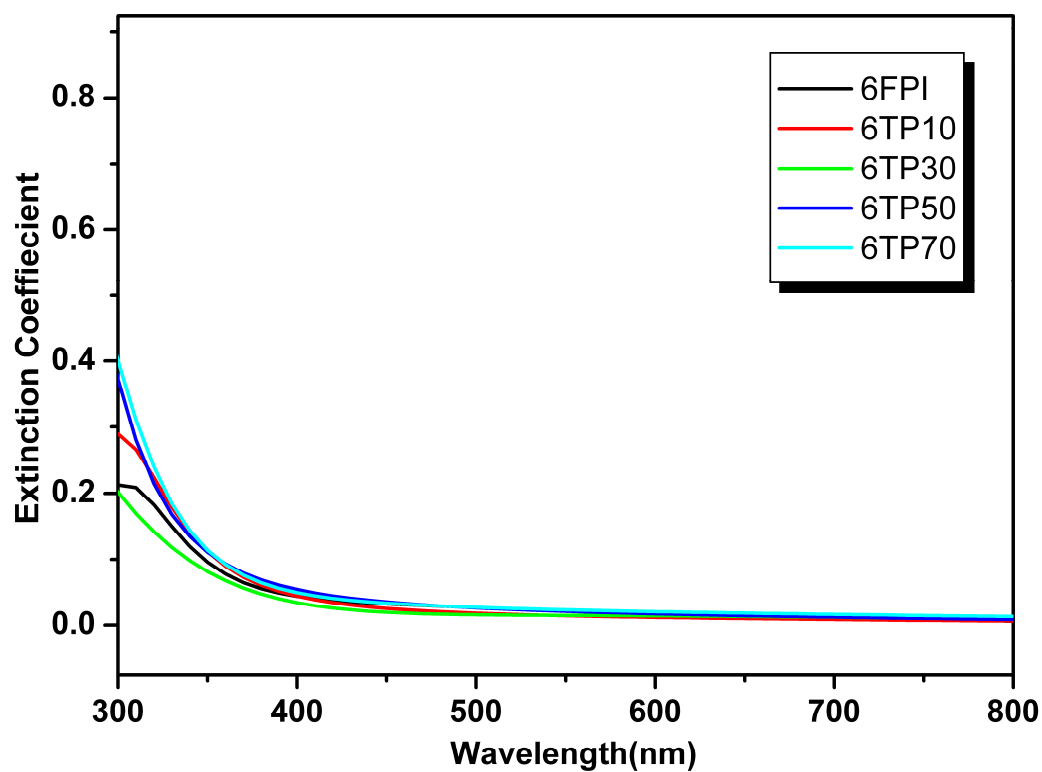


Fig. S5 Variation of the extinction coefficients of the polyimide-titania hybrid films in the range of 300-800 nm.